



Dewormer Resistance on Virginia Sheep Farms

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Introduction

It is widely known that infections with gastrointestinal nematodes slow the growth of young animals, and cause increased death of stock, thereby reducing the overall production from small ruminant enterprises. Use of chemical anthelmintics (dewormers) is one option utilized to reduce parasite infections. However, drug resistance to the three major classes of dewormers (Table 1: benzimidazoles (BZ), nicotinic agonists (NA), and macrocyclic lactones (ML)) has been reported globally (Kaplan, 2004)

Figure 1 shows the results from two studies conducted from 2006 – 2009 to determine dewormer resistance on sheep and goat farms in the Mid-Atlantic and southern regions of the U.S. The results indicated that dewormer resistance in worms is a serious problem on small ruminant farms throughout the Eastern United States.

Table 1. Dewormers used in sheep and goats

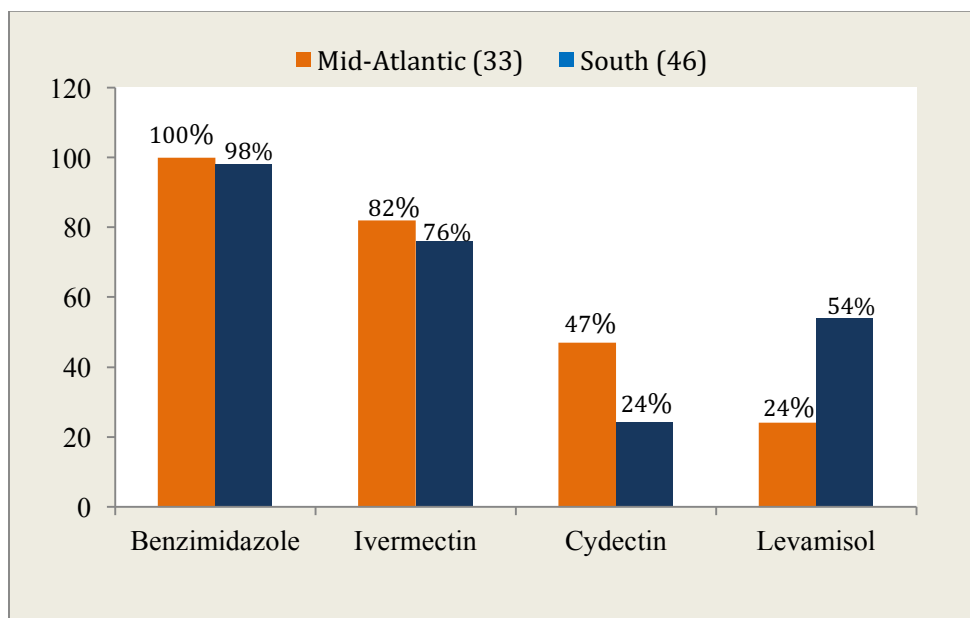
Drug Class	Drug name	Tradenames
Benzimidazoles	Fenbendazole, albendazole, oxydendazole	SafeGuard®, Valbazen®, Panacur®, Synanthic®
Nicotinic Agonists	Levamisol, morantel, pyrantel	Prohibit®, Strongid®, Positive Pellet®, Rumatel®
Macrocyclic lactones	Ivermectin, doramectin, eprinomectrin, moxidectin	Ivomec®, Cydectin®, Quest®, Dectomax®, Eprinex®

Project Objective and Methods

To obtain more current data, funding was received in 2016 (American Sheep Industry Let’s Grow grant, P.I. Susan Schoenian and co-PIs Dahlia O’Brien and Niki Whitley) to assist sheep producers in testing for dewormer resistance on their farm. During the summer of 2016 and 2017, the project coordinator in VA (Dr. Dahlia O’Brien) identified farms and visited each to facilitate the collection, preparation, and shipment of pooled fecal samples. The samples were submitted to Dr. Ray Kaplan’s lab at the University of Georgia for DrenchRite® analysis

(<https://www.wormx.info/storeyhowell2012>). The cost of each test was \$450. Let's Grow paid for half of the testing and the producer/Virginia State University paid the other half. Results, interpretation and recommendations were provided by the project coordinator to participating farmers.

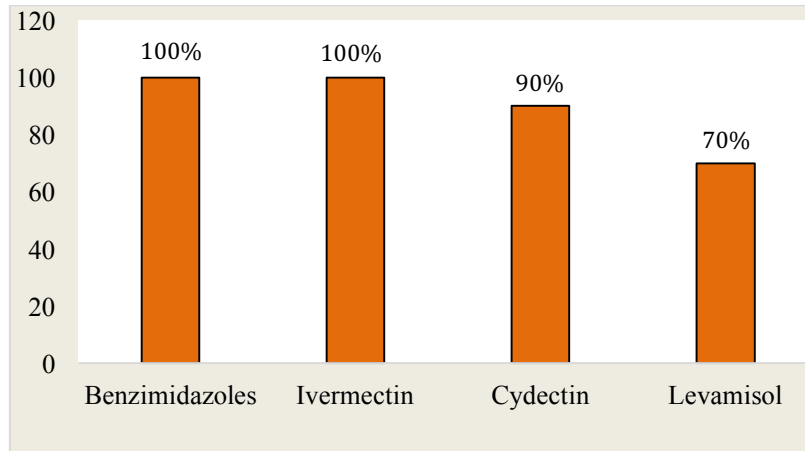
Figure 1. Dewormer resistance status of small ruminant farms in the U.S (2007 – 2009; Howell et al., 2008; Crook et al., 2016)



Results

Results of the DrenchRite® test indicated resistance to benzimidazoles, ivermectin, cydectin and levamisole on 100%, 100%, 90%, and 70% of farms, respectively (Figure 2). Sixty percent of farms tested had moderate to high resistance (< 50%) to all classes of dewormers indicating total anthelmintic failure on these farms.

Figure 2. Dewormer resistance status of 10 sheep farms in Virginia (2016 - 2017)



Study Conclusions/Implications

The results of this study confirm the widespread existence of dewormer resistance on VA sheep farms. This makes training in sustainable integrated parasite management techniques even more critical so that small ruminant producers are armed with a combination of tools to use in controlling worms on their farms. Producers should realize the value in determining the status of dewormer resistance on their farm and then work closely with their veterinarian to determine the best approach for worm control. This might include combination dewormers for higher drug efficacy (<https://www.wormx.info/combinations>). In addition, additional tests need to be conducted to determine the current status on goat farms in VA and determine differences among geographic areas within the state. For more information about small ruminant parasites and their control, please visit the website for the American Consortium for Small Ruminant Parasite Control at: <https://www.wormx.info/>

References

- Crook, E.K., O'Brien, D.J., Howell, S.B., Storey, B.E., Whitley, N.C., Burke, J.M., Kaplan, R.M., 2016. Prevalence of anthelmintic resistance on sheep and goat farms in the mid-Atlantic region and comparison of in vivo and in vitro detection methods. *Small Ruminant Res.* 143, 89–96.
- Howell, S. B., Burke, J. M., Miller, J. E., Terrill, T. H., Valencia, E., Williams, M. J., Williamson, L. H., Zajac, A. M., and Kaplan, R. M., 2008. Prevalence of anthelmintic resistance on sheep and goat farms in the southeastern United States. *J. Am. Vet. Med. Assoc.* 233, 1913-1919.
- Kaplan, R. M., 2004. Drug resistance in nematodes of veterinary importance: A status report. *Trends Parasitol.* 20, 477-481.

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